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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/037,067
Filing Date: December 21, 2001
Appellant(s): CLUNE ET AL.

Joseph B. Ryan, Reg. No. 37,922
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 16 April 2007 appealing from the Office action mailed 22 September 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,219,352 BONOMI 4-2001

Knuth, Donald E. "The Art of Computer Programming", 2nd Edition, volume 1 "Fundamental Algorithms", 1973, pages 228-231 and 270-273

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6 219 352 to Bonomi et al in view of "The Art of Computer Programming: 2nd Edition" to Knuth.

Regarding claim 1, Bonomi discloses a method for identifying destination nodes of a multicast session in a network having a plurality of nodes, comprising forming a linked list ("queue") further comprising a list of destination nodes, each destination node having an associated destination address

for receiving multicast data ("port mask") and a link to a next destination node in the list for processing ("head pointer"); entering the list at an initial destination node; traversing the linked list to process each destination node, for each destination node, sending the multicast data to the associated destination address and using the link to determine the next destination node for processing; and terminating the traversing step when all linked destination nodes have been processed (terminating at the "tail pointer"). (column 10, line 61-column 11, line 35; column 13, lines 40-column 14, line 16, specifically column 13, lines 46-60 and column 14, lines 3-16)

Bonomi does not expressly disclose a circularly linked list, however, Knuth does disclose a circularly linked list (page 270, section 2.2.4 "Circular Lists", specifically "A circularly-linked list...has the property that its last node links back to the first...It is then possible to access all of the list starting at any given point")

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of these references since Knuth discloses that using a circularly linked list allows for entry into the list at any point (page 270, section 2.2.4 "Circular Lists", specifically "It is then possible to access all of the list starting at any

given point"). In view of these specific advantages and that the references are directed to traversing linked lists or queues and entering a linked list at a given point, one of ordinary skill would have been motivated to combine these references and would have considered them to be analogous to one another based on their related fields of endeavor.

Regarding claim 2, Bonomi and Knuth disclose the method of claim 1.

Bonomi discloses the method further comprising receiving data intended for transmittal to the identified destination nodes of the multicast session. (Figure 2, step 220; column 7, line 54-column 8, line 36, specifically column 7, lines 56-61; column 13, lines 46-48)

Regarding claim 3, Bonomi and Knuth disclose the method of claim 2.

Bonomi discloses wherein the initial destination node is determined from the received data. (column 10, lines 12-60, specifically lines 16-22; column 11, lines 18-47).

Regarding claim 4, Bonomi and Knuth disclose the method of claim 2.

Bonomi discloses wherein at least one destination node of the list, as determined from the received data, is excluded from the multicast session. (column 14, lines 17-25).

Regarding claim 5, Bonomi and Knuth disclose the method of claim 4.

Bonomi discloses wherein the received data includes an indicator identifying the destination node that is to be excluded from the multicast session. (column 14, lines 17-25)

Regarding claim 6, Bonomi and Knuth disclose the method of claim 5.

Bonomi discloses wherein the indicator identifies the destination node from which the data was received as the destination node to be excluded from the multicast session. (column 2, lines 45-67; column 14, lines 17-25).

Regarding claim 7, Bonomi and Knuth disclose the method of claim 1.

Bonomi discloses wherein the initial destination node is predetermined (column 13, lines 40-column 14, line 2, specifically column 13, lines 52-55)

Regarding claim 8, Bonomi and Knuth disclose the method of claim 1.

Bonomi discloses the method further comprising receiving data intended for transmittal to the identified destination nodes of the multicast session on an input port, and wherein the initial destination node is determined based on the input port.

(column 10, lines 12-60, specifically lines 16-22; column 11, lines 18-47; column 14, lines 47-58)

Regarding claim 9, Bonomi and Knuth disclose the method of claim 1.

Bonomi discloses wherein the address for entering the list is the destination node from which the data was received. (column 10, lines 12-60, specifically lines 16-22; column 11, lines 18-47)

Regarding claim 10, Bonomi and Knuth disclose the method of claim 1.

Bonomi discloses wherein the traversed destination node entries are the identified destination nodes of the multicast session. (column 13, lines 46-60)

Regarding claim 11, Bonomi and Knuth disclose the method of claim 1 wherein destination nodes for a plurality of multicast sessions are interleaved in the list, and wherein the destination nodes for each one of the plurality of multicast sessions are linked. (column 13, lines 18-25)

Bonomi does not expressly disclose a circularly linked list, however, Knuth does disclose this limitation (page 270, section 2.2.4 "Circular Lists", specifically "A circularly-linked list...has the property that its last node links back to

the first...It is then possible to access all of the list starting at any given point").

Claim 11 is rejected since the motivations regarding the obviousness of claim 1 also apply to claim 11.

Regarding claim 13, Bonomi and Knuth disclose the method of claim 1.

Bonomi discloses wherein the link comprises a pointer at each destination node that points to another destination node such that the plurality of destination nodes are linked.

Bonomi does not disclose wherein the destination node entries are circularly linked, however, Knuth does disclose wherein entries are circularly linked (page 270, section 2.2.4 "Circular Lists", specifically "A circularly-linked list...has the property that its last node links back to the first...It is then possible to access all of the list starting at any given point").

Claim 13 is rejected since the motivations regarding the obviousness of claim 1 also apply to claim 11.

Claim 14 is rejected since claim 14 recites a method that contains substantially the same limitations as recited in claims 1 and 12 in combination.

Claim 15 is rejected since claim 15 recites an apparatus that contains substantially the same limitations as recited in claim 1.

(10) Response to Argument

Response to arguments presented for claims 1-3, 7, 8, 10, 11, 13 and 15:

First, the Examiner submits that the Applicant does not provide arguments that the combined teachings of Bonomi and Knuth fail to teach or suggest the limitations of the claims other than the concept of circularly linked lists that Bonomi does not expressly disclose. Therefore, the only issue regarding whether the claims stand or fall is whether the combination of the teachings of Bonomi and Knuth is proper. The Examiner submits that the combination of these references is proper for at least the following reasons.

In light of the Applicant's silence with respect to the steps of forming a linked list, entering the list at an initial destination node, traversing the linked list to process each destination node within the linked list by sending multicast data to an associated destination address within the node and using a link to determine the next destination node the next destination node for processing, and terminating the traversal of the linked list when all linked destination nodes have been

processed are disclosed within Bonomi (see above rejection for relevant passages within Bonomi). The Examiner also asserts that the general steps claimed for the formation and traversal of a linked list is of notorious character and is well known by those of ordinary skill in the art.

MPEP 2144.03 states:

"Furthermore, it might not be unreasonable for the examiner in a first Office action to take official notice of facts by asserting that certain limitations in a dependent claim are old and well known expedients in the art without the support of documentary evidence provided the facts so noticed are of notorious character and serve only to "fill in the gaps" which might exist in the evidentiary showing made by the examiner to support a particular ground of rejection. In re Zurko, 258 F.3d 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001); Ahlert, 424 F.2d at 1092, 165 USPQ at 421."

While the aspects of these cases do not entirely control here, the Examiner cites this passage within the MPEP to assert that the above steps meet the "notorious character" standard regarding linked lists and to also support the Examiner's position that, while Bonomi fails to recite circularly linked lists, the mere idea of a circularly linked list is of such "notorious character" that one of ordinary skill in the art

would have recognized the uses and features of circularly linked lists including at least for the reasons the Examiner has shown within the teachings of Knuth and that Knuth merely as an "evidentiary showing" to support that circularly linked lists were of such an obvious nature that, in the absence of any additional limitations within the claims to support any specific and different features for using such a recited circularly linked list, the general use of a circularly linked list would have been obvious to one of ordinary skill in the art at the time the invention was made and that Knuth merely fills the gap of Bonomi's deficiency regarding the express disclosure of circularly linked lists. Therefore, the Examiner submits that the first requirement of a *prima facie* case of obviousness has been met, namely that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Furthermore, it is also asserted by the Examiner that the recited steps of forming and traversing a linked list are applicable to both general and circularly linked lists as taught within the teachings of both Bonomi and Knuth. Therefore, one of ordinary skill in the art would have expected the recited steps to operate with a circularly linked list in the same manners as

described in Bonomi. Therefore, the Examiner submits that the second requirement of a *prima facie* case of obviousness has been met, namely that there must be a reasonable expectation of success.

Since the combined teachings of Bonomi and Knuth teach or suggest all of the claim limitations, the Examiner submits that all of the requirements for a proper prima facie case of obviousness have been met. The Applicant has also failed to provide any other arguments or evidence to show unobviousness. Therefore, in sum, the Examiner submits that the rejection under 35 USC 103(a) is proper and that the rejection be maintained.

Response to arguments presented for claims 4-6:

The Applicant argues that that Bonomi fails to disclose excluding at least one destination node of the list from the multicast session as determined from an indicator identifying the destination node as the node that sends the data and that the node is to be excluded from the multicast session of the received data intended for transmittal to the destination nodes. The Examiner submits that Bonomi does at least reasonably suggest, if not disclose, this limitation. Bonomi discloses that "Multicast typically refers to the ability of one end-station (source end station) to send a cell to several end-stations (target end-stations) without the source end-station having to

retransmit the cell to the individual target end stations. Thus, a multicast connection may be viewed as a tree having several output branches corresponding to a single root or source. To support multicasts, an intermediate switch may transmit each cell received on a multicast connection on several ports, with each transmission corresponding to an output branch. A cell transmitted on a port may be transmitted on several additional ports in another switch located further down the cell transmission path. Such transmission on multiple ports in one or more intermediate switches enables an ATM backbone to support multicast transmissions. Thus, when a source end-system sends a sequence of multicast cells on a multicast connection, a switch may need to transmit each of the cells several times (corresponding to several branches) to ensure that the cell is received by all of the intended target end-systems. A switch may maintain multiple copies of each multicast cell, with each copy being used for transmission on an output branch." (column 2, lines 46-60)

Bonomi goes to further disclose that "Ingress processor 410 receives ATM cells according to a pre-specified protocol on lines 401 and 402 from individual ports (not shown). In one embodiment, the cells are received using the UTOPIA protocol known well in the industry. According to this protocol,

information is received as to which port a corresponding cell is received on. The received port and VPI/VCI information in a cell are used to identify the input multicast connection. The input multicast connection is identified by VCTAG. VCTAG table 415 stores the information necessary for determining the VCTAG for a received cell based on VPI/VCI and port information. When a new connection is opened, ingress processor 410 updates the information in VCTAG table 415. Ingress processor 410 determines VCTAG corresponding to each received cell by examining VCTAG table 415. Ingress processor 410 transmits the VCTAG information to traffic manager 420 on bus 412 when scheduled to do so by port scheduler 440. Such scheduling is usually necessary because ingress processor 410 may broadcast VCTAG information to all traffic managers in switch 120, and the bus used for the broadcast may be shared by all ingress processors. In addition, the frequency of examining a port is dependent on the aggregate bandwidth configured for the port. The bandwidth information is stored in card scheduling table 445. Card scheduling table 445 may include information necessary for egress processing as well. Thus, based on the data in card scheduling table 445, ingress processor processes the data received on lines 401 and 402. Ingress processor 410 transmits cell data (including header and payload) to data path 480 on bus 418." (column 10, lines 12-41)

Bonomi then discloses that "Queue manager 430 determines the ports on which each cell needs to be transmitted. In one embodiment described in further detail below, queue manager 430 maintains a port mask associated with each QID. A table providing the mapping may be stored in scheduler memory 431. The port-mask identifies the output branches (in port card 491) on which the cells of that QID need to be transmitted. As each branch may be associated with a port, the port-mask indicates the specific ports in port-card 491 on which the cells for the corresponding QID need to be transmitted. For multicast cells to be transmitted on more than one port of a port card, the port-mask will indicate that transmission is required to more than one port. In one embodiment, only one branch of a physical queue can be transmitted on a port, and a bit is therefore maintained for each branch/port. One value indicates that the cells corresponding to the QID need to be transmitted on a corresponding port, and the other value indicates that the cell should not be transmitted on the port. Cells for each output branch are identified by a logical queue. All the logical queues are based on a single physical queue. The maintenance of physical and logical queues in an example embodiment will be described below." (column 11, lines 26-47)

Therefore, in view of the above disclosures, Bonomi expressly discloses that a node sends data to the data switch wherein the data includes information on where the data has arrived from. Bonomi also discloses that, when the determination is made as to where the received data is to be sent to, there is a provision within the system that allows for the data not to be sent to a destination node. Since it does not make reasonable sense to send data back to a node that has the sent the data in the first place, Bonomi essentially discloses these limitations since excluding the "destination node" that actually sends the data that has been received would have been at least reasonably inferred from the disclosures of Bonomi. Also, it would have been considered to be common sense to those of ordinary skill regarding the transmission of data between computers that conventional data transmission systems do not generally send data back to the source of such data, especially when it is possible to indicate to the system that the cell should not be sent to a particular node. Therefore, it is submitted that Bonomi does at least reasonably suggest these limitations and that the rejection of claims 4-6 be maintained.

Response to arguments presented for claims 9 and 14:

The Applicant argues that the address for entering the list is the destination node from which the data was received. The

Examiner submits that Bonomi discloses wherein "Memory manager 450 keeps track of the free locations available for storing the received cells. Free-list memory 451 is used to store the necessary information. In one embodiment, the free-list is maintained as a linked list. A head pointer and a tail pointer are maintained, with the tail pointer being updated each time a free location is added and the head pointer being updated when a free location is provided for storage of a newly arrived cell." (column 12, lines 7-14)

Bonomi also discloses that "Each logical queue is processed to transmit cells on an output branch. Multicasting is achieved by transmissions of cells on all such output branches. A logical queue is defined by a head-pointer and a tail-pointer to the stored physical queue. All the logical queues based on a single physical queue can share a single tail-pointer, which will require the updating of only a single pointer on the addition of a new cell received on a multicast connection. The tail pointer identifies the storage location of the last cell received on a connection...As each logical queue is traversed (by scheduler 470) in the cell order, the head-pointer corresponding to that logical queue is updated to reflect the processed cells for that branch. Thus, a head pointer for a logical queue points to the

next cell to be processed in the cell order for that logical queue (branch)." (column 13, lines 23-31 and 40-45)

Therefore, in light of the above disclosures, the head pointer which indicates where to enter the list is the oldest entry of data to be transmitted and that the tail pointer is updated when new data is received. Therefore, the address used to enter the list is, by virtue, the destination node which sent the data. Therefore, it is submitted that Bonomi does disclose this limitation and the rejection of claims 9 and 14 should be maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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